

WHAT IS CLAIMED IS:

- 1                   1.       A method for manufacturing a mask for integrated circuit devices, the  
2 method comprising:  
3                   providing a quartz substrate having a surface, the quartz substrate comprising  
4 a thickness;  
5                   forming a MoSi film overlying the surface of the quartz substrate;  
6                   patterning the MoSi film overlying the quartz substrate to form a mask pattern;  
7 and  
8                   forming an opaque edge structure comprising a carbon bearing material on a  
9 portion of the surface around a peripheral region of the mask pattern; whereupon the opaque  
10 edge structure has a light transmittance ranging from about 0% to about 3%.
- 1                   2.       The method of claim 1 wherein the forming of the opaque edge  
2 structure is provided by laser deposition.
- 1                   3.       The method of claim 1 wherein the forming of the opaque edge  
2 structure is provided by focused ion beam.
- 1                   4.       The method of claim 1 wherein the opaque edge structure occupies a  
2 region on the quartz substrate that is free from the mask pattern.
- 1                   5.       The method of claim 1 wherein the mask pattern is for a half tone  
2 phase shift mask.
- 1                   6.       The method of claim 1 further comprising cleaning the patterned MoSi  
2 film and opaque edge structure.
- 1                   7.       The method of claim 1 wherein the carbon is in a C<sub>12</sub>, C<sub>13</sub>, C<sub>14</sub> state.
- 1                   8.       The method of claim 1 wherein the patterning of the MoSi film is a  
2 photolithography process.
- 1                   9.       The method of claim 8 wherein the patterning is the only  
2 photolithography process used by the method.
- 1                   10.      The method of claim 1 wherein the mask pattern is free from a chrome  
2 film.

1                    11.     A method for processing integrated circuit devices, the method  
2 comprising:  
3                    providing a mask structure, the mask structure comprising a quartz substrate  
4 having a surface, a patterned MoSi film overlying the surface of the quartz substrate to form a  
5 mask pattern, and an opaque edge structure comprising a carbon bearing material on a portion  
6 of the surface around a peripheral region of the mask pattern; and  
7                    using the mask structure for applying a pattern onto a photosensitive material  
8 overlying a semiconductor substrate.

1                    12.     The method of claim 11 wherein the mask structure is a mask.

1                    13.     The method of claim 11 wherein the carbon bearing material is in a  
2 C<sub>12</sub>, C<sub>13</sub>, C<sub>14</sub> state.

1                    14.     The method of claim 11 wherein the forming of the opaque edge  
2 structure is provided by laser deposition.

1                    15.     The method of claim 11 wherein the forming of the opaque edge  
2 structure is provided by focused ion beam.

1                    16.     The method of claim 11 wherein the opaque edge structure occupies a  
2 region on the quartz substrate that is free from the mask pattern.

1                    17.     The method of claim 11 wherein the mask pattern is for a half tone  
2 phase shift mask.

1                    18.     The method of claim 11 further comprising cleaning the patterned  
2 MoSi film and opaque edge structure.

1                    19.     A half tone phase shift mask for integrated circuit devices, the mask  
2 comprising:  
3                    a substrate having a surface;  
4                    a patterned light blocking film overlying the surface of the substrate; and  
5                    an opaque edge structure comprising a carbon bearing material on a portion of  
6 the surface around a peripheral region of the mask pattern.

1                    20.     The mask of claim 19 wherein the carbon bearing material is in a C<sub>12</sub>,  
2 C<sub>13</sub>, C<sub>14</sub> state.